

WHAT IS CLAIMED IS

1. A fuel cell assembly including at least one unit fuel cell comprising a separator having flow channels for oxidizing gas, a cathode to which the oxidizing gas is fed, a membrane electrolyte of proton conductivity, an anode to which fuel gas is fed, and a separator having flow channels for the fuel gas, the above members being arranged in order, wherein said fuel cell assembly further comprises a humidifier having a porous member to humidify at least the oxidizing gas to be fed to said anode; the porous member of said humidifier is so disposed as to face at least the flow channels for said oxidizing gas so that water is supplied to said flow channels from part of the surface of the porous member opposite to the water supplying face and/or from the outer periphery of said porous member.

2. The fuel cell assembly of claim 1, wherein said porous member is made of a hydrophilic polymer material, a carbonaceous porous material, or a composite material thereof.

3. The fuel cell assembly of claim 1, wherein the thickness of a humidifying water inlet of said humidifier is  $1/2$  to  $3/4$  of the thickness of said porous material.

4. The fuel cell assembly of claim 1, wherein a water permeable membrane having a function to transmit water is formed on said porous material.

5. The fuel cell assembly of claim 4, wherein said  
5 water permeable membrane is 0.01 to 0.1 micrometer on a mean micro-pore diameter and 10 to 100 micrometers thick.

6. The fuel cell assembly of claim 4, wherein said water permeable membrane has a porosity of 50 to 90%.

10 7. The fuel cell assembly of claim 4, wherein said water permeable membrane is one or more membranes that are treated to be hydrophilic and are selected from the group of polytetrafluoroethylene, polystyrene, and copolymers of styrene and butadiene.

15 8. The fuel cell assembly of claim 1, wherein said humidifier has a carbonaceous porous filter.

9. The fuel cell assembly of claim 1, wherein said porous member has a hydrogen-oxidizing catalyst dispersed therein.

20 10. The fuel cell assembly of claim 1, wherein said humidifier is provided for each or a group of said unit fuel cells.

11. A power generation system comprising an apparatus which produces or stores a hydrogen  
25 containing gas and a fuel cell assembly connected to

said apparatus with a piping through which said fuel gas flows, wherein said fuel cell assembly of claim 1 generates electricity using said fuel gas from said apparatus.

5           12. A fuel cell assembly including at least one unit fuel cell comprising a cathode, an anode, and an membrane electrolyte placed therebetween, wherein said humidifier which humidifies the oxidizing gas is equipped with a water-retaining layer.

10           13. The fuel cell assembly of claim 12, wherein said water-retaining layer has a hydrophilic porous member.

15           14. The fuel cell assembly of claim 12, wherein said water-retaining layer is 10 to 300 micrometers on a mean micro-pore diameter.

          15. The fuel cell assembly of claim 12, wherein said water-retaining layer is a polypropylene non-woven cloth or a polyethylene-polypropylene non-woven cloth that is made hydrophilic.

20           16. The fuel cell assembly of claim 12, wherein said water-retaining layer has a porous member which is provided opposite to said unit fuel cell and has a water supplying surface; and water is supplied from part of a surface opposite to the water supplying  
25           surface of the porous member and/or from the outer

edge of said porous member.

17. A fuel cell assembly including at least one unit fuel cell comprising a cathode, an anode, and a membrane electrolyte placed therebetween, wherein said  
5 fuel cell assembly further comprises a humidifier to humidify a fuel gas which is fed to said anode and said cathode; said humidifier has a water-retaining layer which is provided to the flow channels of said fuel gas and has one surface to supply water to said  
10 flow channels; and water is supplied from part of a surface opposite to the water supplying surface and/or from the outer edge of said water-retaining member.